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Attorney Docket No. 47753.C2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Ted TSAI  
Application No.: 09/609,513  
Filing Date: July 3, 2000  
Title: MINIMIZING CHLORINATED ORGANICS  
IN PULP BLEACHING PROCESSES  
Examiner: M. Alvo  
Group Art Unit: 1731

RESPONSE

Honorable Commissioner for Patents  
Washington, D.C. 20231

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Sir:

In response to the Office Action dated June 19, 2001, Applicant submits the following remarks.

REMARKS

Claims 1-7, 10-11, 13 - 17, 19 - 26, 29-37, 39 - 42, and 44 - 48 are in the case. In the Office Action, the claims were rejected as being obvious over EP 622,491 in view of a series of supporting references including the Devenyns et al. publication, the Sergeyev et al. publication, the Nonni patent, and the Singh textbook. Each of these rejections is respectfully traversed.

I. EP 622,491 Does Not Describe or Suggest the Claimed Sequence.

EP 622,491 ("the '491 reference") fails to describe or suggest the claimed invention. According to the present invention, wood pulp is bleached in two chlorine dioxide stages (D) with an intermittent extraction stage (E), all carried out prior to being

bleached in a final peroxide stage (P). In at least the second D stage (and preferably in the first D stage as well), the pulp is treated with a chelating agent to adjust the metals profile of the pulp prior to the peroxide bleaching. Thus the invention employs bleaching sequences such as  $D_0E_{O+P}D_1P$ ,  $D_0E_PD_1P$ , and  $D_0/C E_PD_1P$  with a chelating agent in at least the  $D_1$  stage.

No such bleaching sequence is taught in the '491 application. The '491 application only describes the use of a single D stage prior to peroxide bleaching. The '491 application teaches that this single stage is ideal, since by using only a single stage of chlorine dioxide the amount of chlorinated effluents can be kept to a minimum. In particular, the '491 application notes:

It is possible to bleach the pulp to full brightness with an initial chlorine dioxide stage followed by a peroxide stage and still reducing the produced and discharged amount of chlorine containing compounds to an extremely low level.

See Page 4, line 57 - page 5, line 1, emphasis added.

Clearly the '491 application provides no incentive to employ two D stages in an initial DED series of stages prior to peroxide bleaching. Further, to the extent the '491 application suggests any additional use of chlorine dioxide, it suggests using more chlorine dioxide after a peroxide stage, not before. The application states:

After the pretreatment stages and the subsequent bleaching with a peroxide-containing compound, the pulp may be used as such for making paper. If so desired, the pulp may also be finally bleached to a higher brightness in one or more stages, e.g. by means of hydrogen peroxide, ozone, sodium dithionite or chlorine dioxide. Final bleaching can also include alkaline extraction stages which may be fortified by peroxide and / or oxygen.

See Page 5, lines 40 - 44, emphasis added.

II. There is no Motivation or Suggestion to Combine the Supporting References with EP 622,491 As Proposed by the Examiner.

Apparently recognizing the above defects in the '491 application taken alone, the Examiner also cites a collection of supporting references for the supposed proposition that a DED series of stages preceding a peroxide stage is a known substitute for a single D stage, and that it would therefore have been obvious to substitute a DED series of stages for the initial D stage of the '491 application.

While these supporting references may describe bleaching processes employing the stages of DED somewhat in a bleach sequence, they do not provide a “generic” teaching that series of stages “DED” may be universally substituted for a single D stage.<sup>1</sup> The supporting references only describe very specific bleaching processes in which a DED series of stages may have been used. None of these processes include the claimed invention.

To support a finding of obviousness, it is well settled that there must be more than the mere existence of all the elements of the claimed invention in some combination of references. There must also be some suggestion or motivation in the prior art to combine these elements in the manner claimed. According to the Board of Patent Appeals, in order to establish a prima facie case of obviousness it is necessary for the Examiner to present evidence, preferably in the form of some teaching, suggestion, or incentive or inference in the applied prior art, or in the form of generally available knowledge, that one having ordinary skill in the art would have been led to combine the relevant teachings of the applied references in the proposed manner to arrive at the claimed invention. See, Ex parte Levengood, 28 U.S.P.Q. 2d 1300 (Bd. Pat. App. 1993). Such motivation is entirely lacking in the combination of references cited in this case.

Consider, for example, the following analogy. Suppose an automotive mechanic has before him, in a warehouse, a complete universe of vehicle parts that could potentially be used to construct an entirely new vehicle. Does the mere existence of all these parts render any resultant new car design obvious? Of course not, the parts are merely the tools and components with which he works. They do not suggest any combination of the same that would result in a finished product.

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<sup>1</sup>Application of the proposition proposed by the Examiner leads to outrageous results. Suppose, for the sake of argument, it is obvious to substitute a DED sequence for any single D stage within a bleaching sequence. The resultant sequence now includes two D stages, each of which could, in the Examiner’s view, be “obviously” replaced with a series of stages “DED”. This would lead to four D stages, each of which could then be replaced by a further series of DED stages and so forth and on and on. Thus, the logical result of the Examiner’s argument is a sequence employing an unlimited number of D stages each separated by an E stage, i.e., a DEDEDE.....DED ad infinitum sequence.

In the same manner, the mere existence, in isolation, of the various components of Applicants' inventive bleach sequence scattered somewhere among a collection of prior art references cannot render the sequence obvious or even prima facie obvious. While bleaching is typically accomplished in a sequence of "stages", these stages are not self-contained, totally independent "modules" which can be interchanged as desired like tinker toys to always accomplish the same or some "obvious" and predictable result. To achieve the desired final bleached pulp, the number and sequence of the stages must be designed in such a way that the product of each stage provides a suitable starting material for the next stage, which may be advantageously further processed in the subsequent stage.

To extend the automotive analogy, an engine provides an appropriate input to drive a transmission, the transmission provides an input to a drive shaft, the drive shaft drives axles, etc. One could not expect to reverse the engine and transmission "stages" and have the transmission drive the engine. In the same manner, one would not expect to obtain an improved, or even a workable bleaching sequence by reversing or re-arranging the order of the bleaching stages in the manner proposed by the Examiner.

III. If Combined With EP 622,491, the Supporting References Suggest Use of a DED Series of Stages After the Peroxide Stage, Not Before.

From the foregoing it should be apparent that the references cited by the Examiner fail to provide a global motivation to substitute DED series of stages for a single D stage. However, assuming for the sake of argument that these references do provide a suggestion to use a DED series of stages in all bleach sequences that could possibly be imagined (which they plainly do not), they would lead one of skill in the art to employ this sequence after a peroxide (P) stage, not before it.

Nonni, for instance, is directed to use of an extraction stage which may also include oxygen and hydrogen peroxide. This "E<sub>op</sub>" stage is the only use of peroxide described in Nonni and the only stage even remotely similar to a P stage. Nonni teaches that after completion of this stage, the pulp may be further bleached in any of a variety of sequences, including D, DED, (hD), HD, HDED or (hD)ED. Col. 4, lines 33 - 41. Thus,

to the extent Nonni may be combined with the '491 application, this combination would only have led one of skill in the art to employ a further series of bleaching stages such as DED after the P stage described in the '491 application. This is, of course, contrary to Applicant's invention.

The Devenyns et al. publication also fails to suggest substitution of a DED series of stages for a single D stage as claimed in the invention.

Likewise, the portions of the Singh textbook cited by the Examiner are directed to the use of a DED series of stages at the conclusion of pulp bleaching. The large list of sequences on page 127 all include DED stages in the terminal portion of a bleaching sequence.

The combination of these teachings with the '491 application is simply insufficient to direct or lead one of ordinary skill in the art to the claimed invention without the use of hindsight and the use of Applicants' invention as a template. Thus, the claimed invention represents a nonobvious advance in bleaching technology over the cited combination of references.

#### IV. The Claimed Invention Predates the Devenyns et al. Publication and PCT Application WO 95/2700

Beyond all of the foregoing, Applicant also submits herewith a declaration of the inventor, Ted Tsai, with supporting documentation clearly showing that the claimed invention was both conceived and reduced to practice prior to October 1, 1995. Thus, the invention predates the Devenyns et al. publication (dated "October 1995") as well as the PCT application (published on October 12, 1995), and these references therefore may not be cited as prior art.

In light of the foregoing, Applicant urges the Examiner to reconsider the application and find that the claims do in fact define a patentable subject matter over the applied art, to withdraw the rejections, and to issue a notice of allowance at the earliest possible convenience.

In the event this response is not timely filed, Applicant hereby petitions for the

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appropriate extension of time and requests that the fee for the extension along with any other fees which may be due with respect to this paper be charged to our **Deposit Account No. 12-2355.**

Respectfully submitted,

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Encl. Declaration of Ted Tsai  
(Supporting Documentation)

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on Oct. 17, 2001  
Date

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